

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re: Kang-Wook Park

Serial No.: To Be Assigned

Filed: Concurrently Herewith

For: BIPOLAR JUNCTIONS TRANSISTORS HAVING TRENCH-BASED BASE
ELECTRODES AND METHODS OF FORMING SAME

Date: July 23, 2001

BOX PATENT APPLICATION

Commissioner for Patents

Washington, DC 20231

PRELIMINARY AMENDMENT

Dear Sirs:

Please enter the following Preliminary Amendment before examining the present application.

In the Title:

Please delete the title in all occurrences and substitute the following title therefor:

-- BIPOLAR JUNCTION TRANSISTORS HAVING TRENCH-BASED BASE
ELECTRODES --.

In the Specification:

At page 1, under Related Application heading, please insert the following paragraph:

This application is a divisional of U.S. Patent Application No. 09/425,812, filed October 25, 1999, now U.S. Patent No. _____, the disclosure of which is hereby incorporated herein by reference.

In the Claims:

Please cancel Claims 10-26.

Please add the following Claims 27-28:

27. (New) A bipolar junction transistor, comprising:

an electrically insulating layer on a surface of a semiconductor substrate having an intrinsic collector region of first conductivity type therein, said electrically insulating layer comprising a composite of a first electrically insulating material layer and a second electrically insulating material layer on the first electrically insulating material layer and having a lateral recess therein that extends along an undersurface of the second electrically insulating material layer;

a trench that extends into the surface of the semiconductor substrate and into the intrinsic collector region and is self-aligned to an opening in said electrically insulating layer;

a base electrode of second conductivity type that extends in said trench and into the lateral recess within said electrically insulating layer;

a base region of second conductivity type that is self-aligned to a portion of said base electrode extending into the lateral recess and forms a P-N rectifying junction with said intrinsic collector region; and

an emitter region of first conductivity type that forms a P-N rectifying junction with said base region.

28. (New) A bipolar junction transistor, comprising the steps of:

a semiconductor substrate having an intrinsic collector region of first conductivity type therein that extends to a surface thereof;

an electrically insulating layer on the surface of a semiconductor substrate, said electrically insulating layer having an opening therein and a lateral recess extending from the opening;

a trench that extends into the surface semiconductor substrate and the intrinsic collector region and is self-aligned to the opening in said electrically insulating layer;

a polysilicon base electrode of second conductivity type in the lateral recess and in the trench;

an extrinsic base region of second conductivity type that extends into the intrinsic collector and is self-aligned to a portion of the polysilicon base electrode that extends into the lateral recess; and

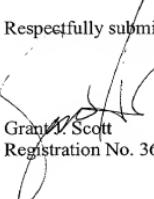
an emitter region of first conductivity type that extends in the intrinsic collector region.

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REMARKS

The present divisional application is being filed to pursue non-elected device Claims 1-9 from the parent application and new device Claims 27-28. The title has been changed to reflect the device claims. Favorable examination and allowance of the present divisional application is respectfully requested.

Respectfully submitted,


Grant V. Scott
Registration No. 36,925



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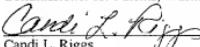
PATENT TRADEMARK OFFICE

CERTIFICATE OF EXPRESS MAILING

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Date of Deposit: July 23, 2001

I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to BOX PATENT APPLICATION, Commissioner for Patents, Washington, DC 20231.


Candi L. Riggs
Date of Signature: July 23, 2001